

Influence of wind energy in a seawater desalination plant by reverse osmosis

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ABSTRACT

The objective of this work is to investigate the contribution of renewable energy to a desalination plant that uses reverse osmosis technology. During the development of this research study and after the analysis that was undertaken of the wind conditions in which the reverse osmosis plant is located, it was determined that the best option was to discard the use of photovoltaic energy as a source and instead install a wind turbine. As it is a large capacity reverse osmosis plant, it was necessary to consider the entire desalination process of the facility, which comprises several phases. After a seawater capture process using an intake tower, the water is then transported and stored before passing through a physical and chemical pre-treatment stage where the highest possible percentage of impurities and organic material is eliminated to prevent fouling of the reverse osmosis modules. After carrying out plant sizing and calculating the energy that the plant consumes, it was determined that a 15% renewable energy contribution to plant operation was feasible, corresponding to 1,194 MWh y^{-1} . As there is already a wind power installation in the area, it was decided to use one of the installed wind turbines, more specifically the Ecotecnia (20/150) which provides 1,920 MWh y^{-1} . That is, for this installation only a single wind turbine is needed.

Keywords: Seawater; Reverse osmosis; Desalination; Renewable energies

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